NEED TO KNOW
a national security newsletter

Volume 2, Number 3 April 2002

Greg Miller (left) and Ray Fink (right) analyzed advanced technologies such as tablet computers, personal data assistants, digital signatures and remote video feeds to select those they are incorporating into BechteLink.

BechteLink Delivers Tools to the Field Engineer

A Bechtel field engineer is inspecting a construction site in Sulawesi, Indonesia. The air is heavy with rain either just ending or about to start, or both. The light, filtered through the dense vegetation is tinted green. The engineer has been puzzling over a design feature and a possible improvement comes to mind. He reaches to his hard hat and clicks a few buttons there and begins speaking, gesturing to a support strut. He listens, points and continues. He flips open a handheld computer, downloads a drawing, and sketches some alterations. After sending the redlined version along with the video that he just shot to Frederick, Md., he catches up on some urgent email. A few minutes later, his office responds and he opens their attachment. The improvement works, is approved and will be incorporated into the ongoing construction. Fast track. He continues his inspection as it starts to rain.

This scenario is fiction, but the concepts behind it are not. Improving engineering, procurement and construction processes in the field through advanced information technologies is the backbone of an INEEL project called BechteLink. According to National Security's Advanced Information and Communication System employee Greg Miller, BechteLink's goal is to 'provide unfettered access to knowledge.'

BechteLink has three main objectives: deliver information when, where, and in the form needed; develop paperless construction and design office technology; and convert processes from sequential to near real time. Miller and colleague Ray Fink have teamed with others at the NEEL to deliver tools that will do just this.

In a nutshell, Miller and Fink analyze new technologies and select the emerging winners – what is or will rapidly become a commodity. Wireless data networks, handheld computers, digital signatures. They tie the latest and greatest hardware to Bechtel's existing data using human oriented, custom graphical interfaces. The end result is electronic replacements for outmoded paper processes offering significant savings.

See **BECHTELINK**, *page 2*

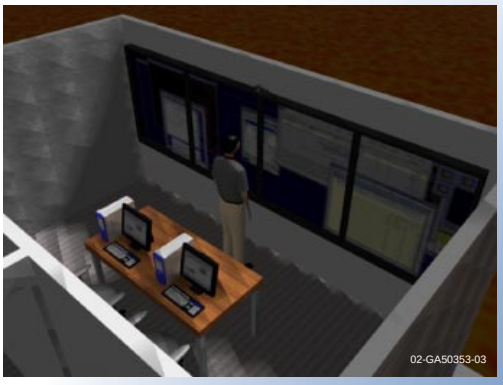
BECHTELINK *(continued from page 1)*

"Construction is such a competitive environment, profits lie in doing it better, cheaper, faster," explains Miller. "Bechtel doesn't have time for tricks that don't work. We have to deliver products that are completely reliable."

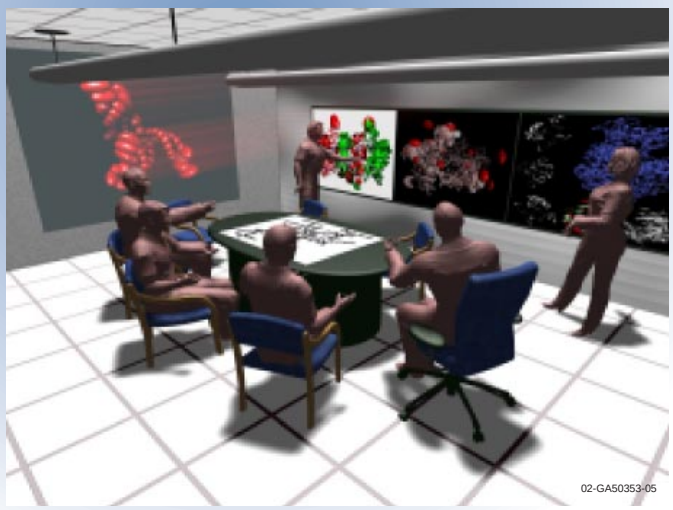
Why the INEEL

Bechtel National, along with BWX Technologies and the Inland Northwest Research Alliance operate the INEEL for the Department of Energy. Bechtel has committed to conducting corporate-funded research and development projects of mutual interest at the INEEL. Bechtel issues a call for proposals addressing corporate concerns and researchers submit ideas for consideration. In the case of BechteLink, Bechtel fellows traveled to the INEEL for a 'think tank' session. They discussed high-level issues confronting the giant construction company with a diverse audience of INEEL researchers and scientists. Miller attended this session and responded with a white paper, introducing the BechteLink concept. Bechtel liked it and funded it through the CFRD program.

An unlikely couple on the surface, the marriage of Bechtel National and the INEEL is actually a match made in heaven. In this instance, INEEL information technology experts have written custom programming applications for decades and can leverage their expertise and existing products for quick turnaround. At the same time, the INEEL staff is willing and desirous to understand exactly how the global Bechtel operates, perhaps not a typical characteristic of university research organizations. BechteLink is set up to deliver both short-term products and long-term research. CFRD work products



These concept drawings show various projected uses for BechteLink technologies including computer kiosks on the construction site to paperless design offices, all linked via a wireless data network.



are shared – Bechtel gets the immediate products and INEEL can in turn apply the results to anything from military to environmental cleanup projects.

So step one for the INEEL computer engineers was putting on a Bechtel field engineer's hat – understanding the customer inside and out, work processes and business systems, strengths and areas for improvement. Miller and Fink traveled to construction sites and spoke with the men and women on the front line. They learned about the common denominators of time, cost, material status, tools and resources. They studied the current processes, which were largely paper-based and sequential, and delved into Bechtel internal initiatives for process improvements.

Like pilgrims, they then traveled to halls of academia where they investigated cutting edge, long-term research conducted by Stanford University on paperless offices and shared electronic workspaces. Industry was the next stop for the BechteLink team.To quote Miller, "they performed triage" on the emerging technologies, selecting those products on which they would build a suite of tools.

43 months of concrete

The first tool rolling out is the virtual Concrete Pour Card, an application for the Department of Energy Hanford site, where over the next three-plus years Bechtel will construct the Waste

Treatment Plant. The Concrete Pour Card uses XML technology and computational knowledge-based systems, and presents them to the engineer in a familiar package via graphic user interfaces. The tool automates the concrete pour authorization process, accessing existing Bechtel data over the Internet and allowing the field engineer to remain connected to Bechtel's computer network while in the field. Thousands of yards of concrete will be poured over months and months. This simple tool will exact huge savings.

The objectives of deploying the concrete pour card go beyond the value of automating that one process. The Waste Treatment Plant is the pilot for evaluating the wirelessly networked hand-held computer based virtual card concept. The BechteLink team is looking for feedback from the field on the strengths and weaknesses. Team members want to know if the display is adequate, if the virtual cards are useful, if it's robust enough and if it's reliable. Field engineers will test it for handwritten note taking and the potential for voice input. And after weaknesses are identified and corrected, more work begins.

BechteLink will "productionize" the concrete pour card, creating a foundation on which to build many other handheld wireless applications. Miller sees Bechtel IT professionals using the INEEL's designed and developed modularized concepts to roll out automated construction processes ranging from excavation to cable pulling.

In 2002, the BechteLink team plans to deploy a wireless data network infrastructure and test the concrete pour card on not only on the handheld system but also on electronic-ink based tablets and touch-screen kiosk computers deployed at the construction site. The team will also choose a design-change-notice scenario and create a full collaborative solution from design office to project office to the field. They want to re-engineer sequential, paper-based processes to fully benefit from networked, distributed, computer-based processes.

Greg Miller
millgv@inel.gov

Merlin – A Wizard of a Tool

Greg Miller has an arsenal of INEEL tools that he can draw upon to cut through some of the thorny issues confronting the BechteLink team. Miller believes that leveraging INEEL expertise will allow his small team to successfully complete their ambitious undertaking in much shorter time. Rather than taking years to write all custom software, he can select available applications and fill in the gaps. INEEL computer software engineers have created award-winning and patented tools for dozens of applications that may serve this Bechtel customer well. One tool the team might use is Merlin.

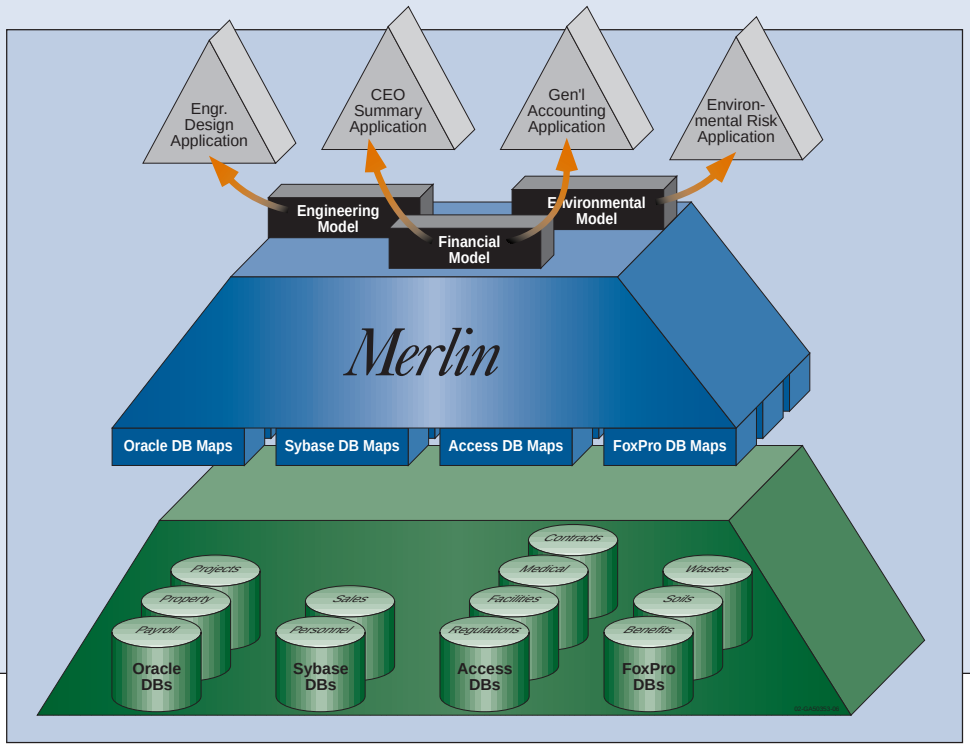
The Merlin Mediation System is an intelligent data integration tool. Like the fabled magician with whom it shares its name, Merlin performs amazing feats. Merlin can access different databases — whether residing in Access, Excel, FoxPro, Oracle, or other sources, or a combination of all of them — and create a virtual database, providing seamless integration of retrieved information. Using Merlin, software developers can build query, reporting, or analysis programs that pluck information from the diverse databases and display the results as if it were generated from a single source.

The databases accessed can be on the same or distributed computer platforms. Merlin can select individual attributes from multiple sources and can even resolve inconsistencies.

What makes Merlin even more magical is that it is not bound to any single user application or specific data sources. Its components use a combination of mediator and expert system technologies to ensure adaptability so that it can be used for a variety of domains and applications with no source code modification.

The BechteLink team hasn't narrowed its sights to selecting a data integration tool yet. The project may require none or more than one. But it's nice to know that they can, like pulling a rabbit from a hat, grab just such a system from the INEEL's deep well of almost magical products.

Lynn Dean
lad@inel.gov



Summers Sees Opportunities with National Security's Defense Infrastructure Systems

Bob Summers sees the potential to do some big things here at the INEEL—big in size and big in its impact to the nation.

After 28 years, Bob Summers left a career that had taken him around the country and around the world. Summers, formerly a brigadier general in the United States Air Force, has come to the INEEL as director of National Security's Defense Infrastructure Systems.

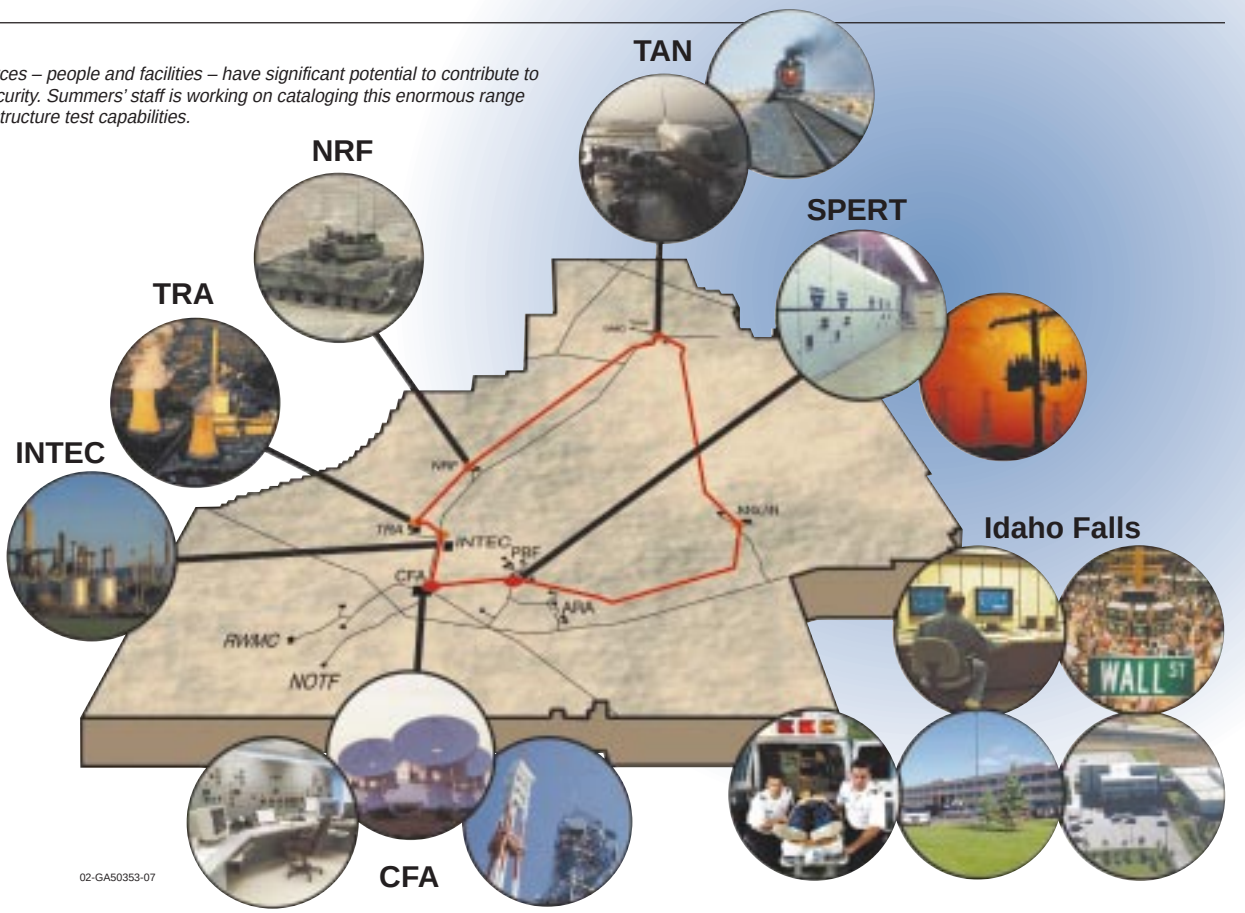
Summers arrived straight from his last posting at the Defense Threat Reduction Agency, where he directed analytical and operations support for senior military commanders emphasizing nuclear, chemical and biological threats. Summers' Air Force career was varied and demanding. He served as vice commander of an air logistics center in California, commanded a missile wing in Wyoming and a missile group in North Dakota, and even taught physics at the Air Force Academy among many challenging assignments. Since January, Summers has focused his considerable experience commanding complex military operations on the National Security directorate responsible for infrastructure protection, and engineered and defense systems.

"One of the first questions everyone asks is why I came here," said Summers. "After I met with Laurin (Dodd) to talk about the opportunity, I came on out to look around. I met a lot of very technically qualified people and saw the potential to do some big things."

The "big thing" that Summers refers to is big – in sheer size and impact to the INEEL and potentially to the nation. Summers is coordinating National Security's efforts to focus the INEEL's resources – both infrastructure and personnel – on the vast and mostly untapped critical infrastructure testing market. Critical infrastructure is defined as that part of the nation's systems – such as energy, banking, transportation, and communication – that are so vital their incapacity would have a debilitating impact on our society.

There should be some place, National Security management proposes, where the nation can

INEEL's resources – people and facilities – have significant potential to contribute to the nation's security. Summers' staff is working on cataloging this enormous range of critical infrastructure test capabilities.



test critical systems against threats – from terrorists, natural disasters, aging and the cyber world. The National Security Division already does this at the INEEL for customers ranging from the Federal Aviation Administration to the military. The INEEL had done it for years in the nuclear industry. Summers has been tasked with formalizing the approach and broadening it to include the capabilities and resources from across the Site.

"We need a theme for the National Security Division," said Summers. "We have a lot of little themes but we need an overarching one. A critical infrastructure test range does just that and encompasses almost all of the work we do now."

Summers points out the many beneficial features the Lab offers customers – small, remote 'cities' with corresponding and isolatable power, transportation, and communication. He sees an unparalleled engineering staff, with the actual experience of designing and developing most of the infrastructure that exists on site.

According to Summers, sometimes it takes an outsider to see the "forest" and he is not referring to himself as that outsider. A new client, visiting the Site for the first time said, "If the INEEL didn't already exist, someone would have to build it." During National Security's last external review, prominent scientific members spoke loud and clear in their summary report. "INEEL has all the pieces to be a national test range."

Summers has been tasked to pull those pieces together. Right now his staff is busy cataloging the enormous range of testing capabilities and expertise at the Site. He, alongside National Security managers, is spreading the word that the INEEL is open for business. Some organizations are already taking advantage of the INEEL's expertise and infrastructure. Bechtel Telecommunications recently established the INEEL as its National Wireless Test Bed, where the next generation of cell phones will be put through their paces.

In the meantime, Summers is even busier himself, learning systems and getting to know people and programs within his directorate. While he is impressed with the engineering and scientific skills of the INEEL, there are a couple of things he wants to change.

"We do engineering work that is really, really good," said Summers. "But it's not enough to just do good work. A lot of people make good products and end up broke. We also need to make the right business decisions."

He believes principal investigators and managers should be looking beyond their immediate projects and anticipating what is next for that customer. They need to look to the future and focus on those opportunities with real growth potential and not jump on a small task that may eventually limit other options.

What in part brought Summers to the INEEL was the Lab's internationally renowned people. He'd like to see those individuals mentor others to expand isolated experts into centers of excellence.

Summers, who has lived in the Rocky Mountains for several assignments, is pleased to be at the INEEL. He calls the Idaho winters "chilly"; North Dakota was "cold." But he is more pleased to remain in national security. It is not just his education, training and almost 30 years in the military that makes this the right field. He believes that protecting the country is what he is supposed to do and the INEEL is now the place to do it.

Bob Summers
summrp@inel.gov

"Chilly" Idaho winters don't intimidate Summers, who commanded a missile group in "cold" North Dakota.

The patent-pending INEEL DataTrace technology can detect pipeline damage and transmit that data to a central receiving station. DataTrace is one of many critical infrastructure protection research projects conducted at the INEEL.

Achievements, Accomplishments, and Acknowledgements

Trudy Overlin, program manager for the Initiatives for Proliferation Prevention program, makes an impact not only here at the INEEL, but also in the community through her volunteer work.

Some National Security employees make an impact both in the workplace and in their communities. Trudy Overlin, program manager for the Initiatives for Proliferation Prevention, is one. Overlin received the 2001 Women in Business-Government Award given by the Idaho Falls Chamber of Commerce to recognize individuals who have displayed excellence in their profession and through volunteer efforts in organizations throughout the region.

Overlin, who is in the process of completing her doctorate in political science/labor politics, still finds time to act as an academic adviser for the Lou Milam Next Step Scholarship Program. She volunteers for the Bonneville County Land Use Planning Commission, is chair of the 2002 Western Political Science Association, and is a member of the Idaho Business Women's Society. Overlin teaches introductory level political science and criminal justice courses at Idaho State University (See Need to Know, January 2001, "Teach Your Children Well") and in her spare time, volunteers with the Idaho Chapter of Civitans International.

- A Defense Advanced Research Projects Agency customer wrote to thank Scott Bauer and Matt Anderson for their assistance with an Army research project. "I was appreciative of your enthusiasm and professionalism in coming off the bench and contributing both physically and mentally to our exercise…I look forward to our continued working together this year to

From the editor:

The INEEL National Security Division had been working with Olympic organizers for about two years prior to the start of the Games, as members of the Utah Olympic Public Safety Command. As a result of this collaboration, I was invited to participate in UOPSC's Joint Information Center in the role of news writer. The JIC was responsible for disseminating information to the media and public regarding any safety and health aspects or incidents deemed relative to the Games. During my 17 days in Salt Lake City, I was constantly amazed at just how widely television and newspapers journalists interpreted that parameter.

Law enforcement representatives composed the majority of the JIC, including those from local, state and federal agencies. Other members included the Environmental Protection Agency, departments of Transportation and Health, and the Games representatives, the Salt Lake Organizing Committee. The membership afforded a comprehensive view of the safety and health activities both in preparation and during the Olympic events. Should an incident occur requiring media or public notification, all the resources were at hand to ensure the timely and accurate release of information.

The exceptionally good news was that no such incident occurred, though law enforcement officials responded to many false alarms. The other good news was the apparently seamless integration of the many and diverse police forces. They really worked well together.

I had a rather small and narrow perspective of the Olympic Winter Games. But even that tiny window afforded me an incredible view of the complexity of staging this monumental international event. I thought Salt Lake and UOPSC did an outstanding job and I felt lucky to be part of it.

Kathy Gatens, INEEL National Security Communications Liaison and Need to Know *editor, served at the Joint Information Center during the 2002 Winter Olympics.*

provide the highest quality testing environment …"

- Rahmat Aryaeinejad, Edward Reber and Dave Spencer have had two papers accepted for publication in the June 2002 IEEE Transactions on Nuclear Science, "Development of a Handheld Device for Simultaneous Monitoring of Fast Neutrons and Gamma Rays" and "Using the Cockroft-Walton Voltage Multiplier with Photomultipliers."
- Joel Hubbell and James Sisson received a patent for "Field Matric Potential Sensor."
- Gail Cordes, Jack Hartwell and M. Elena Velasquez have submitted a patent disclosure on "Improving Resolution of Cadmium/Zinc/Telluride Detectors and Simplifying Isotope Identification."
- Sally Sifuentes has submitted a patent disclosure on "Radioactive Liquid and Gas Acquisition System."
- David Crandall and Mike Occhionero submitted a patent disclosure on "Wind Velocity Measurement Using Change Detection."
- Robert Cherry and Allen Anderson received a patent for "System and Method for Monitoring Water Content or Other Dielectric Influences in a Medium."
- Jill Scott and Paul Tremblay submitted a patent disclosure on "Laser Device."
- Dennis Bingham and Russell Ferguson received a patent on "Method and Apparatus for Pressurizing Vaporous Fluids."
- Mike O'Brien, Ron Heaps, Blair Park, Ron Wallace and Craig Seymour have submitted a patent disclosure "Unique Composite Materials System and Processing Methods for High Temperature Reaction Chamber."
- Eric Greenwade presented an invited paper at the Computation Physics Colloquia Series at Technische Universiteit Delft. The title of the paper was "INEEL's Subsurface Initiative."
- Eric Greenwade and Andrew Shewmaker presented an invited paper titled, "Next Generation Beowulf-class Supercomputers" at the SUPerG 2001 Conference in Amsterdam.

State of the Division

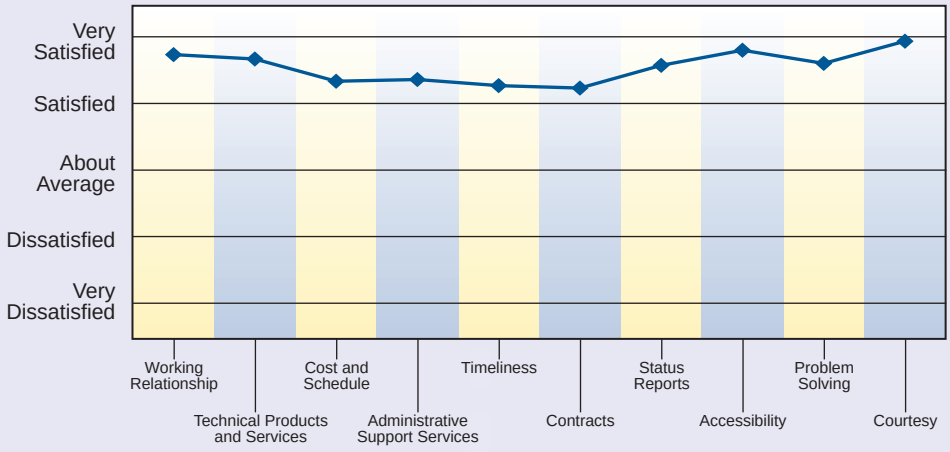
Laurin Dodd,
Associate Laboratory Director,

We *"Need to Know"*

When you ask someone what they think of your performance, you risk finding out some deficiencies. But to improve, you must look to external feedback. For the second year, that is exactly what the National Security Division has done. On a formal basis, we have surveyed our customers in an effort to identify areas for concentrated improvement. The results, summarized in the graph below, are outstanding. The comments submitted voluntarily by our customers were even better, including statements such as, "My experience has been that INEEL is quick to understand the problem and requirements and very responsive to accomplish tasks in a timely fashion. I know that other organizations could benefit from their capabilities," and, "They bring to the table a unique combination of institutional genius and operational knowledge, putting aside bureaucratic process to get the job done successfully and timely at a good price." I will be forwarding the results to the individual programs and managers surveyed. Congratulations to all of our staff on a job well done. We will continue to survey customers annually and look to the results for improvement opportunities. However, we welcome any suggestions you may have at any time.

We're doing the same thing with this issue of the newsletter, surveying you, the reader, regarding your opinions of this quarterly publication. Please take the time to fill in the enclosed postcard or go to www.inel.gov/nationalsecurity/survey. We'd like to make *Need to Know* a better newsletter.

Average Customer Responses



"Competitive Intelligence"

Contributed by: Bruce Allbright

The last issue of the CI Corner addressed the outsider threat. This issue considers economic espionage.

Competitive intelligence is becoming a critical business practice with inherent economic implications as businesses and foreign nations discover that they need to do something in these uncertain times. Knowing what the competition is up to is a vital part of doing business. According to a recent study, more than 5,000 corporate spies actively are engaged in intelligence activities. Nine out of ten large companies have employees dedicated solely to the competitive intelligence function reports Fuld & Co., an intelligence consulting firm. Now consider foreign intelligence agents that are also seeking information. Anytime, but particularly during a recession or slow economic times, collecting information about a competitor can pay off – big-time.

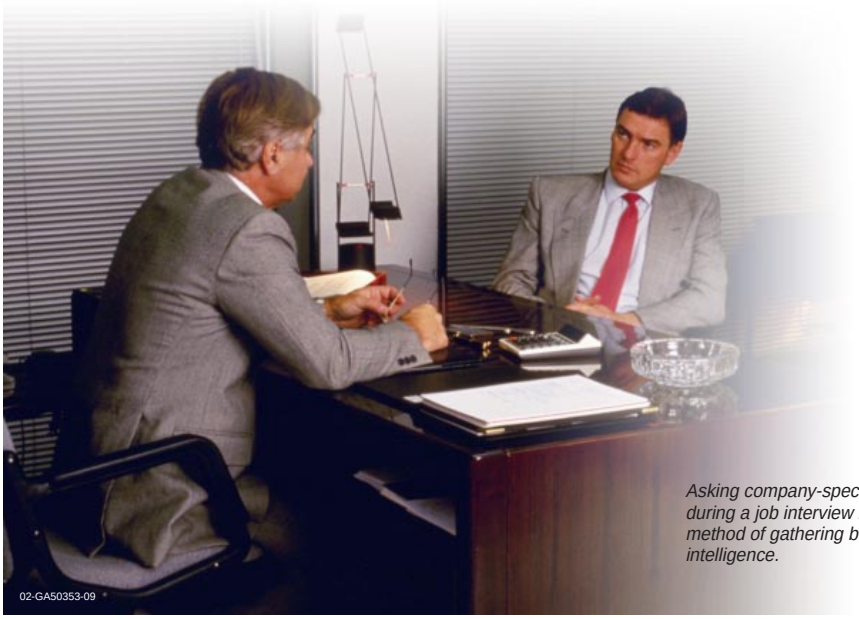
Trying to stay a step ahead of the competition, companies are increasingly walking a fine line between market intelligence and corporate espionage. Recently, Proctor and Gamble revealed it used covert means to gather competitive business intelligence about hair-care products from its main consumer products rival, Unilever. Two years ago, Oracle Corp. confessed its detectives paid janitors to sift through Microsoft's garbage in hope of finding information it could use in court against the software giant.

John Nolan, chairman of Phoenix Consulting Group, says "the extent to which people will compromise what would be considered proprietary or sensitive information is awe-inspiring."

As INEEL employees, we must be aware of what we say in public places, what we leave in hotel rooms or what we throw away in the trash whether at work or at home. Valuable information can be inappropriately obtained or given easily through some of the following methods:

- Listening to conversations in airports or going through company rubbish (known as "dumpster diving" or "trash intelligence"),
- Attending trade shows or professional conferences and someone asking you for information,
- Interviewing an applicant for employment and the candidate asking very company-specific questions,
- Answering unsolicited e-mail or phone calls,
- Talking with people who are touring the INEEL, or
- Working directly with visitors/assignees

Remember JDLR (Just Doesn't Look Right). Contact your Counterintelligence Office or Security Office if you have any questions or concerns. For more information about espionage check out the INEEL internal Counterintelligence Web page.



Asking company-specific questions during a job interview is a common method of gathering business intelligence.

NEED TO KNOW *is a publication of the National Security Division of the Idaho National Engineering and Environmental Laboratory. The INEEL is a science-based, applied engineering national laboratory dedicated to supporting the U.S. Department of Energy's missions in environment, energy, science and national security. The INEEL is operated for the DOE by Bechtel BWXT Idaho, LLC, in partnership with the Inland Northwest Research Alliance. Requests for additional copies, story ideas or questions should be directed to the editor at (208) 526-1058, kzc@inel.gov. This is printed on recycled paper.*

Editor ..... Kathy Gatens
Graphic artist .... David Combs
Photographers .. Mike Crane, Chris Morgan, Ron Paarmann
Copy editing ..... Rick Bolton

Visit our national security website at: www.inel.gov/nationalsecurity